



**Dr. Angel A. Rivera, CTO
Quorum X Diagnostics**

A highly trained and experienced scientist, Dr. Angel A. Rivera, currently serves as Chief Technology Officer (CTO) of Quorum X Diagnostics (QXD). His extensive background in Gene Therapy and Targeting as well as Virology has equipped him with the skills necessary to work with lateral flow diagnostics and viral infections which aligns with the proprietary technology being developed by QXD. Although Dr. Rivera's primary research interests have been studying carcinomas and cell-to-cell interaction, under the tutelage of *Dr. Maria Nagy*, CEO, QXD, he has expanded his research base to include bacteria communication and the possibilities of detecting infections via quorum sensing molecules.

Angel came to the continental United States from Puerto Rico in his late teens. Here, he developed an interest not just in medicine but the scientific work and research that give synergy to patient care. It was during his early studies and with the death of his father, *Dr. Angel R. Rivera* (an oncologist-surgeon), to prostate carcinoma, that Angel decided to put emphasis on this unknown dilemma. Landing at a superb and unique institution, The University of Alabama at Birmingham (UAB), Angel was determined to learn and understand contact inhibition or abnormal growth, immunosurveillance of malignancies, or immune protection and hence, the reason for carcinomas among other diseases.

Fortunately, he was confronted with elite scientists at UAB as well as at Louisiana State University (LSU) and Emory University. Therefore, he was able to study and contribute to the realm of malignancies and treatments. Learning from remarkably high caliber scientists such as *Dr. Basil Hirschowitz* (father of the flexible endoscope and proton pump inhibitors) as well as immunologists of incredible knowledge and reputation such as *Dr. Max Cooper* (discovered T and B cells), Angel was tutored to always be inquisitive of syndromes, reasons, and possible treatments. His desire to be unique, and to represent his family with dignity made Angel a hardworking pupil with passion through his unique path of science.

Prior to joining QXD, Dr. Rivera's research focus has been in the field of oncolytic adenoviruses. Under the mentorship of *Dr. Terry S. Elton*, Dr. Rivera gained experience on how to isolate, sequence, and characterize a chaperon protein. This knowledge opened the door to a further understanding of elucidating the mechanism for contact inhibition and the impact between normal vs. aberrant behavior revolving around malignancies.

Later, under the direction of *Drs. Joanne T. Douglas, J. Mike Mathis, David T. Curiel, Dmitry Shayakhmetov, and Maciej (Matt) Lesniak*, Dr. Rivera was involved with numerous oncological and Adenovirology research studies. These efforts focused on utilizing non-replicative adenoviral vectors and

oncolytic Ad to target melanoma, glioblastoma multiforme, ovarian and breast carcinoma, among others, as a novel therapeutic approach.

Dr. Rivera, together with *Drs. Louis Chow, Tom Broker, Gene Siegal, and Sanjib Banerjee*, deduced the specificity and oncolysis of various conditionally replicative adenoviruses by using organotypic raft cultures together with immunohistochemistry and western blotting. These efforts allowed Dr. Rivera to gain extensive experience with designing and constructing both oncolytic and non-replicative adenoviral vectors. As such, he was able to determine the exact location within the adenoviral genome that allows the best expression of the delivered gene.

In addition, Dr. Rivera has utilized several adenoviral vectors and oncolytic Ad *in vivo*. For example, he specifically used *in vivo* mouse and rabbit models for the implantation of adenoviral vectors and oncolytic Ad, the pre-surgical isolation of stem cells, and the transduction of bone marrow stromal cells. Through this work, he has essentially “armed” oncolytic Ad in the E3B region to deliver osteoprotegerin (OPG), an inhibitor of osteoclastogenesis.

Dr. Rivera together with *Drs. Anton V. Borovjagin, James J. Cody, Dirk M. Nettlebeck and Qiana L. Mathews* continued his research efforts utilizing mouse models with oncolytic Ad by exploiting its dual ability to inhibit the progression of cancer in bone metastases either by directly lysing tumor cells or by reducing osteoclast activity, thereby improving tumor burden and survival. He has introduced the adenovirus serotype 3 hexon gene into a serotype 5 oncolytic Ad, thus, making it less liver-tropic and more antitumor efficient. In addition, he has extensive experience with the isolation of RNA, DNA, and quantitative PCR (qPCR) as well as Reverse Transcriptase quantitative PCR (RT-qPCR) for human, mouse and rabbit tissue.

Under the guidance of *Dr. Luis Vasconez*, Dr. Rivera was able to perform several *in vivo* experiments using rabbit’s skin demonstrating, for the first time, that with down-regulation of several cytokines, scar-less wound healing can be accomplished. Later, *Dr. Ashan Husain* taught Dr. Rivera how to detect Chymase from human arteries and veins using quantitative PCR, ELISA, and immunopathology and its correlation to cardiomyocytes development and healing.

Dr. Rivera, together with *Dr. Navdeep Jhita*, spent six years under the mentorship of *Dr. Pete Lollar* learning the intrinsic science of factor VIII (fVIII), the different hybrid moieties and the efficacy inpatient care. Here, the objectives were as follows: to elucidate where the antigenic epitope of fVIII is located, testing the stability of the hybrids *in vitro* and *in vivo*, and utilizing the production of these fVIII permutations with the goal to transfer into the clinical setting in an effort to treat Hemophilia A.

In summary, Dr. Rivera’s scientific career represents a long-standing focus on virus-host interactions, carcinomas, and Gene Therapy treatments as well as the studies of protein interactions, immune response, and diseases. Hence, he brings to QXD the knowledge and skills necessary to conduct the proposed research as well as clinical studies. His work has produced over 80 peer reviews, 4 inventions, 3 patents. When he is not in the lab, Dr. Rivera’s hobbies include playing the guitar, singing, and exercising. In addition, he loves any opportunity to teach.